



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

AppMet, Inc.
7308 Peppermill Parkway
North Charleston, SC 29418

has been assessed by ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

while demonstrating technical competence in the field of

CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

AC-1358

Certificate Number


ANAB Approval

Certificate Valid: 12/05/2016-12/06/2018
Version No. 009 Issued: 12/5/2016



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

AppMet, Inc.

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CALIBRATION

Valid to: December 6, 2018

Certificate Number: AC-1358

I. Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(±)]	Reference Standard or Equipment	Methods
DC Voltage - Source	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1 kV	20 μV/V + 1.1 μV 13 μV/V + 1.6 μV 12 μV/V + 21 μV 19 μV/V + 0.14 mV 19 μV/V + 1.5 mV	Fluke 5520A	GIDEP-Sourced Procedures
AC Voltage - Source	(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz 330 mV to 3.3 V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.73 mV/V + 8.9 μV 0.13 mV/V + 6.7 μV 0.19 mV/V + 6.6 μV 0.98 mV/V + 6.5 μV 3.5 mV/V + 13 μV 8 mV/V + 51 μV 0.23 mV/V + 46 μV 0.14 mV/V + 11 μV 0.15 mV/V + 11 μV 0.34 V/V + 11 μV 0.81 V/V + 33 μV 2.0 mV/V + 72 μV 0.21 mV/V + 0.42 mV 0.14 mV/V + 83 μV 0.19 mV/V + 67 μV 0.28 mV/V + 67 μV 0.68 mV/V + 0.17 mV 2.3 mV/V + 0.61 mV		

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
AC Voltage - Source (cont.)	(3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) KHz (20 to 50) KHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz 330 V to 1.02 kV 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.24 mV/V + 4.2 mV 0.15 mV/V + 0.81 mV 0.23 mV/V + 0.83 mV 0.34 mV/V + 0.89 mV 0.88 mV/V + 1.9 mV 0.18 mV/V + 10 mV 0.19 mV/V + 9.7 mV 0.24 mV/V + 8.9 mV 0.29 mV/V + 9.4 mV 2 mV/V + 59 mV 0.30 mV/V + 22 mV 0.30 mV/V + 13 mV 0.30 mV/V + 6.6 mV		
DC Current - Source	Up to 330 μ A 330 μ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	1.2 μ A 31 μ A/A to 1.2 μ A 84 μ A/A + 1 μ A 91 μ A/A + 6.9 μ A 0.19 mA/A + 46 μ A 0.37 mA/A + 95 μ A 0.49 mA/A + 0.64 mA 0.95 mA/A + 1.6 mA	Fluke 5520A	GIDEP-Sourced Procedures
AC Current - Source	(29 to 330) μA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 330 μA to 3.3 mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	4.1 mA/A + 40 nA 4.3 mA/A + 0.11 μ A 3.9 mA/A + 0.10 μ A 4.6 mA/A + 90 nA 8.5 mA/A + 0.18 μ A 2.2 mA/A + 0.69 μ A 1.1 mA/A + 0.93 μ A 0.80 mA/A + 1.0 μ A 1.8 mA/A + 0.90 μ A 4.9 mA/A + 0.69 μ A 1.7 mA/A + 4.1 μ A 0.80 mA/A + 4.7 μ A 0.33 mA/A + 4.1 μ A 0.73 mA/A + 3.8 μ A 2 mA/A + 4.1 μ A		

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
AC Current - Source (cont.)	(33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 330 mA to 1.1 A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (1.1 to 3) A (45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (3 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (11 to 20.5) A (45 to 100) Hz 100 Hz to 1 kHz	1.7 mA/A + 29 μ A 0.86 mA/A + 36 μ A 0.38 mA/A + 26 μ A 1 mA/A + 52 μ A 2 mA/A + 0.10 mA 1.7 mA/A + 0.13 mA 0.49 mA/A + 0.12 mA 6 mA/A + 1 mA 1.8 mA/A + 0.13 mA 0.60 mA/A + 0.10 mA 0.58 mA + 1.6 mA 0.59 mA/A + 2.3 mA 0.99 mA/A + 2.1 mA 1.2 mA/A + 6.2 mA 1.5 mA/A + 5.8 mA	Fluke 5520A	GIDEP-Sourced Procedures
Resistance - Source	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω	0.10 m Ω / Ω + 1.4 m Ω 32 $\mu\Omega$ / Ω + 1.5 m Ω 29 $\mu\Omega$ / Ω + 1.4 m Ω 27 $\mu\Omega$ / Ω + 2.2 m Ω 29 $\mu\Omega$ / Ω + 1.6 m Ω 30 $\mu\Omega$ / Ω + 26 m Ω 29 $\mu\Omega$ / Ω + 22 m Ω 30 $\mu\Omega$ / Ω + 0.18 Ω 30 $\mu\Omega$ / Ω + 0.17 Ω 30 $\mu\Omega$ / Ω + 2.1 Ω 50 $\mu\Omega$ / Ω + 4.1 Ω 60 $\mu\Omega$ / Ω + 34 Ω 0.10 m Ω / Ω + 43 Ω 0.30 m Ω / Ω + 2.3 k Ω 0.50 m Ω / Ω + 3.7 k Ω 3.1 m Ω / Ω + 47 k Ω		
DC Voltage - Measure	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	8.7 μ V/V + 0.33 μ V 8.0 μ V/V + 0.30 μ V 8.0 μ V/V + 0.56 μ V 9.6 μ V/V + 43 μ V 9.4 μ V/V + 0.76 μ V	HP 3458A	

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(±)]	Reference Standard or Equipment	Methods
Capacitance - Source	190 pF to 3.3 nF (3.3 to 11) nF (11 to 110) nF (110 to 330) nF 330 nF to 1.1 μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF 330 μA to 1.1 mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	5 mF/F + 10 pF 3 mF/F + 9.4 pF 3 mF/F + 0.10 nF 2 mF/F + 0.35 nF 3 mF/F + 0.90 nF 2 mF/F + 3.4 nF 3 mF/F + 9 nF 5 mF/F + 0.5 nF 4.7 mF/F + 96 nF 4.6 mF/F + 0.30 nF 4.5 mF/F + 1.1 μF 4.5 mF/F + 3 μF 4.4 mF/F + 10 μF 7.6 mF/F + 30 μF 11 mF/F + 0.10 mF	Fluke 5520A	
AC Voltage - Measure	Up to 10 mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (10 to 100) mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz 100 mV to 1 V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz	0.30 mV/V + 3 μV 0.20 mV/V + 1.1 μV 0.27 mV/V + 1.5 μV 0.90 mV/V + 2 μV 4.9 mV/V + 2 μV 40 mV/V + 4.8 μV 61 μV/V + 4.9 μV 62 μV/V + 3.3 μV 0.13 mV/V + 3.3 μV 0.26 mV/V + 6.7 μV 0.77 mV/V + 5.3 μV 3 mV/V + 12 μV 9.8 mV/V + 23 μV 15 mV/V + 19 μV 69 μV/V + 42 μV 67 μV/V + 24 μV 0.14 mV/V + 24 μV 0.30 mV/V + 24 μV 0.80 mV/V + 24 μV 3 mV/V + 0.10 mV 10 mV/V + 0.13 mV 15 mV/V + 0.10 mV	HP 3458A	GIDEP-Sourced Procedures



Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
AC Voltage - Measure (cont.)	(1 to 10) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (10 to 100) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz 100 V to 1 kV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.20 mV/V + 0.46 mV 96 μ V/V + 0.24 mV 96 μ V/V + 0.24 mV 0.29 mV/V + 0.26 mV 0.80 mV/V + 0.20 mV 3 mV/V + 1 mV 10 mV/V + 1.4 mV 15 mV/V + 1 mV 0.20 mV/V + 4.3 mV 0.20 mV/V + 2.4 mV 0.19 mV/V + 2.5 mV 0.34 mV/V + 2.6 mV 1.2 mV/V + 2 mV 4 mV/V + 10 mV 15 mV/V + 11 mV 0.40 mV/V + 41 mV 0.40 mV/V + 22 mV 0.60 mV/V + 22 mV 1.2 mV/V + 23 mV 3 mV/V + 22 mV	HP 3458A	GIDEP-Sourced Procedures
DC Current - Measure	100 nA to 1 μ A (1 to 10) μ A (10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	30 μ A/A + 41 nA 20 μ A/A + 0.12 nA 20 μ A/A + 0.80 nA 20 μ A/A + 5 nA 20 μ A/A + 51 nA 35 μ A/A + 0.50 μ A 0.11 mA/A + 10 μ A		
AC Current - Measure	Up to 100 μA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz 100 μA to 1 mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4 mA/A + 0.30 μ A 1.5 mA/A + 0.30 μ A 0.60 mA/A + 0.30 μ A 0.60 mA/A + 0.30 μ A 4.1 mA/A + 0.20 μ A 1.5 mA/A + 0.21 μ A 0.59 mA/A + 0.22 μ A 0.59 mA/A + 0.22 μ A 0.59 mA/A + 0.22 μ A 4 mA/A + 0.40 μ A 5.4 mA/A + 1.6 μ A		

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(±)]	Reference Standard or Equipment	Methods
AC Current - Measure (cont.)	(1 to 10) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz (10 to 100) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz 100 mA to 1 A (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	4 mA/A + 2.1 µA 1.5 mA/A + 2.1 µA 0.59 mA/A + 2.1 µA 0.59 mA/A + 2.1 µA 0.59 mA/A + 2.1 µA 4 mA/A + 4 µA 5.4 mA/A + 16 µA 4.2 mA/A + 3.3 µA 1.2 mA/A + 49 µA 0.59 mA/A + 22 µA 0.60 mA/A + 21 µA 0.59 mA/A + 22 µA 4 mA/A + 41 µA 5.5 mA/A + 0.15 mA 9 mA/A + 0.20 mA 1.6 mA/A + 0.21 mA 0.78 mA/A + 0.22 mA 1 mA/A + 0.22 mA 3 mA/A + 0.21 mA 10 mA/A + 0.40 mA	HP 3458A	GIDEP-Sourced Procedures
Resistance - Measure	10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ	15 µΩ/Ω + 5 µΩ 12 µΩ/Ω + 0.50 mΩ 9.9 µΩ/Ω + 1.3 mΩ 11 µΩ/Ω + 5.7 mΩ 10 µΩ/Ω + 46 mΩ 20 µΩ/Ω + 2 Ω 50 µΩ/Ω + 0.12 kΩ 0.50 mΩ/Ω + 3.8 kΩ 5 mΩ/Ω + 50 kΩ		
Electrical Simulation of Thermocouples Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C	0.51 °C 0.18 °C 0.18 °C 0.22 °C 0.30 °C	Fluke 5520A	GIDEP-Sourced Procedures or AppMet Procedures

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(±)]	Reference Standard or Equipment	Methods		
Electrical Simulation of Thermocouples (cont.) Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C	0.28 °C 0.18 °C 0.16 °C 0.23 °C 0.34 °C	Fluke 5520A	GIDEP-Sourced Procedures or AppMet Procedures		
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C	0.34 °C 0.20 °C 0.18 °C 0.34 °C 0.51 °C				
Type R	(0 to 250) °C (250 to 400) °C (400 to 1 000) °C (1 000 to 1 767) °C	0.58 °C 0.36 °C 0.34 °C 0.53 °C				
Type S	(0 to 250) °C (250 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 767) °C	0.48 °C 0.37 °C 0.38 °C 0.47 °C				
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.64 °C 0.26 °C 0.18 °C 0.18 °C				
Welding Power Supply Voltage Current	0 to 50V 0 to 500A	0.02V 4.4A			Cannon Load Bank and DMM	MET-WM-001

II. Time & Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(±)]	Reference Standard or Equipment	Methods
Stopwatch	Up to 30 hours	0.009 %	5245A	MET-SW-002
Frequency*	10 MHz	1.2×10^{-12} Hz	GPS Receiver	GIDEP-Sourced Procedures

III. Thermodynamic

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
Temperature - Measure	(-50 to 650) °C (650 to 1 350) °C	0.04 °C 2.6 °C	RTD 1502, TC 5520A	GIDEP-Sourced Procedures
Relative Humidity	(0 to 100) % RH	1.2 %RH	Psychrometer	

IV. Mechanical

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
Pressure - Hydraulic	(2 to 10 000) psig	(0.044 + 0.0003 <i>P</i>) psi	Deadweight Tester	GIDEP-Sourced Procedures
Pressure - Pneumatic	(-14.7 to 3) psig (3 to 500) psig	0.0061 psi (0.0026 + 0.00006 <i>P</i>) psi	Deadweight Tester Pressure Module	GIDEP-Sourced Procedures
Torque - Measure	Up to 25 in lb (25 to 250) in lb (25 to 250) ft lb (250 to 600) ft lb	0.59 % of reading 0.59 % of reading 0.62 % of reading 1.6 % of reading	Torque Calibrator	MET-TW-002
Torque - Source	Up to 25 in lb (25 to 250) in lb (25 to 250) ft lb (250 to 600) ft lb	0.08 % of reading 0.065 % of reading 0.066 % of reading 0.14 % of reading	6 in Torque Wheel and Class F Weights	GIDEP-Sourced Procedures
Force	Up to 1 000 lb 1001 to 25 000 lbf	0.29 lbf 18 lbf	Standard Weights, Load Cells	GIDEP-Sourced Procedures
Gas Flow	Up to 250 ccm (0.25 to 6) lpm (6 to 30) lpm (30 to 1 000) lpm	4.7 ccm 0.10 lpm 0.73 lpm 14 lpm	Bubble Generator, Laminar Flow Element	MET-AF-001
Hydraulic Flow	(0.2 to 5) gpm	0.87 % of reading	Stopwatch/Prover	MET-LF-001

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
Flow Totalizer	66 gal	0.021 gal	Volumetric Field Standard	MET-LF-001
Scales	(0.1 to 10) lb (10 to 60) lb (60 to 250) lb	0.002 lb 0.006 lb 0.03 lb	Class F Weights	GIDEP-Sourced Procedures
Analytical Balance	Up to 100 g 100 g to 1 kg	1.3 mg 28 mg	Class 1 Weights	
Hardness	10 to 100 Type A 10 to 100 Type D	1.1 duropoints 1.1 duropoints	Durometer Calibrator	

V. Dimensional

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
Micrometers - Outside - Inside	Up to 12 in (1.5 to 12) in	(61 + 11L) μ in (130 + 4.5L) μ in	Gage Blocks	GIDEP-Sourced Procedures
Calipers	Up to 40 in	(530 + 7.5L) μ in		
Height Gages	Up to 40 in	(300 + 1.6L) μ in		
Indicator Calibrator	Up to 1 in	24 μ in		
Depth Gages	Up to 24 in	(150 + 7.4L) μ in		
Length Standards	Up to 28 in	(78 to 4.0L) μ in	Gage Blocks and Analog Comparator	

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
Cylindrical Plugs*	Up to 10 in	(6.1 + 12L) μ in	Gage Blocks with ID/OD Comparator	GIDEP-Sourced Procedures
Cylindrical Rings*	(0.125 to 11) in	(0.4 + 13L) μ in		
Dial Indicators	Up to 2 in	140 μ in	Indicator Calibrator	
Angle	0 to 90 degrees	0.005 deg	10 in Sine Bar	MET-SB-001
Roughness	118 μ in	5.2 μ in	Roughness Standard	Mfr Manuals

Notes:

1. Calibration and Measurement Capabilities (CMCs) (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of k=2.
2. This laboratory's capabilities include laboratory and on-site calibration services at customer-designated locations. Since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
3. Capabilities denoted with an asterisk (*) are laboratory-only, not available for on-site calibration activity.
4. The use of (P) signifies Applied Pressure in psi.
5. The use of (R) refers to the Resolution of the device under test.
6. The use of (L) signifies Length in inches.
7. This scope is part of and must be included with the Certificate of Accreditation No. AC-1358.



 Vice President